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JAP20 Rec'd PCT/PTO 28 JUL 2006

PATENT APPLICATION
Docket No: 14321.90

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Tadao Ishibashi et al.

Serial No.: unknown

) Art Unit

) unknown

Filed: July 28, 2006

)

Confirmation No.: unknown

)

For: AVALANCHE PHOTODIODE

)

TRANSMITTAL FOR INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Transmitted herewith for filing and pursuant to 37 C.F.R. § 1.97 is an Information Disclosure Statement, which includes the following statements, if any, required variously by 37 C.F.R. § 1.98:

- Statement of relevance of selected cited references not in the English language which are not translated.
- Statement that selected cited references are substantially cumulative of an enclosed or previously submitted reference.
- Statement that selected cited references were previously cited by or submitted to the United States Patent and Trademark Office in a prior application which is relied upon for an earlier filing date under 35 U.S.C. § 120.

VERNON R. RICE §
OF COUNSEL

A. Additional Materials Required Due to Content of Information Disclosure Statement

Transmitted are the following documents in addition to the Information Disclosure Statement as required variously under 37 C.F.R. § 1.98:

- X Form PTO-1449 listing five (5) references submitted for consideration.
- X A copy of four of the references listed on the Form PTO-1449.
- English translations of _____ () of the references listed on the Form PTO-1449 which are not in the English language.
- Copies of the following documents from the prosecution of a previous, related application:
 - Form PTO-1449 AND INFORMATION DISCLOSURE STATEMENT; and
 - Form PTO-892

B. Additional Materials Required Due to Timing of Filing of Information Disclosure Statement

The transmitted Information Disclosure Statement is being filed within one (1) of the following four (4) time periods:

- I. X Prior to the later of either three (3) months following the filing date or the mailing of a first Office Action. Accordingly, no materials other than those listed above are enclosed.
- II. — Following the latter of either three (3) months following the filing date or the mailing of a first Office Action, but before the mailing of a final Office Action or a Notice of Allowance. Accordingly, to secure consideration thereof, one (1) of the following is also enclosed:
 - Promptness Certification; or
 - Check No. _____ in the amount of ____ constituting the submission fee set forth in 37 C.F.R. § 1.17(p).
- III. — After the mailing of a Notice of Allowance, but before payment of the Issue Fee. Accordingly, in order to secure consideration thereof, each of the following are also enclosed:
 - Promptness Certificate;
 - Petition for Consideration; and

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— Check No. in the amount of ____ constituting the petition fee set forth in 37 C.F.R. § 1.17(i)(1).

IV. — After payment of the Issue Fee. Accordingly, in order to secure consideration thereof, each of the following are also enclosed:

— Petition to Withdraw from Issue; and

— Check No. ____ in the amount of ____ constituting the petition fee set forth in 37 C.F.R. § 1.17(i)(1).

C. Fees

The Commissioner is hereby authorized to charge payment of or any deficiency in the following fees associated with this communication, or to credit any overpayment thereof, to Deposit Account No. 23-3178. A duplicate copy of this letter is enclosed.

Any fee required in relation to filing of this letter or any documents transmitted therewith.

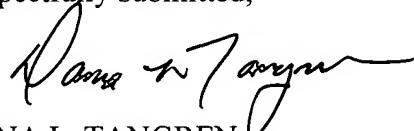
— The submission fee set forth in 37 C.F.R. § 1.17(p) in the event that 37 C.F.R. § 1.97(c) applies and the Examiner is not satisfied that any Promptness Certificate submitted meets the requirements of 37 C.F.R. § 1.97(e).

— The submission fee set forth in 37 C.F.R. § 1.17(p).

— The petition fee set forth in 37 C.F.R. § 1.17(i)(1).

Dated this 28th day of July 2006.

Respectfully submitted,



DANA L. TARGREN
Attorney for Applicant
Registration No. 37,246
Customer No. 022913
Telephone No. 801.533.9800

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INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. § 1.97

Commissioner for Patents
PO Box 1450
Alexandria, Virginia 22313-1450

Sir:

Please find, pursuant to 37 C.F.R. § 1.98(a)(1), the enclosed Form PTO-1449 which contains a list of all patents, publications, or other items that have come to the attention of one or more of the individuals designated in 37 C.F.R. § 1.56(c). While no representation is made that these references may be "prior art" within the meaning of that term under 35 U.S.C. §§ 102 or 103, the enclosed listed references are disclosed so as to fully comply with the duty of disclosure set forth in 37 C.F.R. § 1.56.

Moreover, while no representation is made that a specific search of office files or patent office records has been conducted or that no better art exists, the undersigned attorney of record believes that the enclosed art is the closest to the claimed invention (taken in its entirety) of which the undersigned is presently aware, and no art which is closer to the claimed invention (taken in its entirety) has been knowingly withheld.

In accordance with 37 C.F.R. §§ 1.97 and 1.98, a copy of each of the listed references or relevant portion thereof that is not a US patent document is also enclosed.

Statement of Relevance of References Listed
Unaccompanied by English Translation
Under 37 CFR § 1.98(a)(3)

In accordance with 37 CFR § 1.98(a)(3), the following concise explanation of the relevance of each listed reference that is not in the English language and unaccompanied by a translation into English is provided.

Japanese Publication No. 2000-022197: English translation of this Japanese patent application is U.S. Patent No. 6,104,047. PROBLEM TO BE SOLVED: To obtain a highly reliable giga-bit response avalanche photodiode (APD) having simple element structure. SOLUTION: A laminate structure of an n-type semiconductor buffer layer 12, a semiconductor multiplication layer 13, a p-type semiconductor field relax layer 14, a p-type semiconductor light absorbing layer, a p-type semiconductor cap layer 17 and a p-type semiconductor contact layer 18 is formed is formed on a semiconductor substrate 11. The p-type semiconductor light absorbing layer has a depletion region 15 of 10 nm-0.3 μ m thick abutting on the p-type semiconductor field relax layer 14, and a nondepletion region 16 of 2 μ m thick or less contiguous thereto.

Japanese Publication No. 61-198688: PURPOSE: To obtain the APD of layer GB product, by separating the light absorbing layer from the avalanche multiplying layer to shorten the transit time of carrier in the light absorbing layer. CONSTITUTION: The P<+> InGaAs buffer layer 36, the P<-> InGaAs layer 35, P<-> InGaAs layer 34, P-InAlAs layer 33 and the N<+> InAlAs layer 32 are continuously groven on the P<+> InP substrate 37 by MBE growth method. After then, AuGeNi is deposited for the (n) side electrode, and the MESA etching is performed by applying the deposited layer to the etching mask. AuZn is deposited for the (p) side electrode which is employed as the light receiving element. The incident light 10 enters from the N<+> InAlAs layer 32. The electric field distribution is produced by separating the light absorbing layer 4 into the P-InGaAs layer 34 and the P<-> InGaAs layer 35, so that the transit time of the carrier which travels in the light absorbing layer can be shortened.

Japanese Publication No. 2004-031707: PROBLEM TO BE SOLVED: To provide an ultrahigh-speed avalanche photodiode for use in a long wavelength band, low in operating voltage and in dark current, with the electric fields in the device easy to control. SOLUTION: A semi-insulating buffer layer 101, n-type semiconductor electrode layer 102, semi-insulating semiconductor avalanche multiplication layer 103, electric field control layer 104, p-type semiconductor electric field buffer layer 105, graded band gap layer 106, p-type semiconductor photoabsorption layer 107, p-type semiconductor diffusion barrier layer 108, and a p-type semiconductor electrode layer 109, are deposited in this order on a semi-insulating substrate. Dopant concentration distributions in the graded band gap layer 106 and in the electric field control layer 104 are so set that the electric field of the p-type semiconductor photoabsorption layer 107 is electrically neutral except in the region in the vicinity of the boundary with the graded band gap layer 106.

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Dated this 28th day of July 2006.

Respectfully submitted,



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Form PTO-1449

Applicant: Tadao Ishibashi et al.

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Att'y Docket No.: 14321.90

Art Unit: unknown

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INFORMATION DISCLOSURE CITATIONS MADE BY APPLICANTU.S. Patent Documents

Examiner <u>Initial*</u>	Document <u>Number</u>	Issue <u>Date</u>	<u>Name</u>
____ 1	6,104,047	08/15/2000	Watanabe

Foreign Patent Documents

Examiner <u>Initial*</u>	Document <u>Number</u>	Publication <u>Date</u>	Country or <u>Patent Office</u>	<u>Translation</u>
____ 2	2000-022197	01/21/2000	Japan	No
____ 3	61-198688	09/03/1986	Japan	No
____ 4	2004-031707	01/29/2004	Japan	No

Other Documents

(including author, title, pertinent pages, etc.)

Examiner
Initial*

____ 5 Y. Muramoto et al., *InP/InGaAs Pin Photodiode Structure Maximising Bandwidth and Efficiency*, Electronics Letters, Vol. 39, No. 24, November 27, 2003, pp. 1749-1750.

Examiner:

Date Considered:

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form PTO-1449

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References Cited by Applicants

While the filing of Information Disclosure Statements is voluntary, the procedure is governed by the guidelines of Section 609 of the Manual of Patent Examining Procedure and 37 C.F.R. §§ 1.97 and 1.98. To be considered a proper Information Disclosure Statement, Form PTO-1449 shall be accompanied by a copy of each listed patent or publication or other item of information and a translation of the pertinent portions of foreign documents (if an existing translation is readily available to the applicant), an explanation of relevance of each reference not in the English language, and should be submitted in a timely manner as set out in MPEP Sec. 609.

Examiners will consider all citations submitted in conformance with 37 C.F.R. § 1.98 and MPEP Sec. 609 and place their initials adjacent the citations in the spaces provided on this form. Examiners will also initial citations not in conformance with the guidelines which may have been considered. A reference may be considered by the Examiner for any reason whether or not the citation is in full conformance with the guidelines. A line will be drawn through a citation if it is not in conformance with the guidelines AND has not been considered. A copy of the submitted form, as reviewed by the Examiner, will be returned to the applicant with the next communication. The original of the form will be entered into the application file.

Each citation initialed by the Examiner will be printed on the issued patent in the same manner as references cited by the Examiner on Form PTO-892.

The reference designations "A1," "A2," etc. (referring to Applicant's reference 1, Applicant's reference 2, etc.) will be used by the Examiner in the same manner as Examiner's reference designations "A," "B," "C," etc. on Office Action Form PTO-1142.

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Examiner:

Date Considered:

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.